

Alticola strelzovi. By Adam Nadachowski and Jim I. Mead

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Alticola strelzovi (Kashchenko, 1899)

Flat-headed Vole

Microtus strelzovi Kashchenko, 1899:50. Type locality "Ten'ga Lake, Ust'-Koksinskiy Raion, Altai Mountains, Russia."

CONTEXT AND CONTENT. Order Rodentia, Family Muridae, Subfamily Arvicolinae, Tribe Clethrionomyini (Gromov and Polyakov, 1977; Hooper and Hart, 1962; Musser and Carlton, 1993). Status of the genus is summarized by Mead and Nadachowski (1999). The species belongs to subgenus *Platycranius* Kashchenko, 1901. Three subspecies of *A. strelzovi* are recognized by Corbet (1978) and Musser and Carlton (1993) and two by Gromov and Polyakov (1977) who combined *A. s. strelzovi* with *A. s. desertorum*:

- A. s. strelzovi* Kashchenko, 1899:50 (see above).
- A. s. desertorum* Kashchenko, 1901:203. Type locality "Kara-Kuus, Karkaralinskiy Raion, Karagandinskaya Oblast' Kazakhstan."
- A. s. depressus* Ognev, 1944:178. Type locality "Chegan-Burgazy", Chuiskaya Steppe, Southwestern Altai Mts., Russia."

The new name "*Microtus strelzovi desertorum*" (Kashchenko, 1901) was introduced for *Mus alliarius* Pallas, 1779 (nomen dubium) described by Eversmann (1840). The taxon was redescribed by Ognev (1950) under *Alticola strelzovi desertorum* (description by Ognev and not that used by Kashchenko) and distinguished a new type. According to Pavlinov and Rossolimo (1987) the name of Kashchenko (1901) with the type locality designated by Ognev (1950) should be preserved.

DIAGNOSIS. In comparison with members of subgenus *Alticola*, the skull of *A. (Platycranius) strelzovi* is remarkably depressed, especially in the interorbital region (Kashchenko, 1899, 1901). The height of the skull measured in front of M1 is less than the length of the upper toothrow (Gromov and Polyakov, 1977).

GENERAL CHARACTERS. The flat-headed vole (Fig. 1) is slightly larger than other species of *Alticola*. Ranges of external and cranial measurements (in mm) from the Altai region are as follows: length of head and body, 101-133; length of tail, 33-50; length of hind foot, 14-22; length of ear, 11-19; condylobasal length, 25.2-29.9 (Bannikov, 1954; Heptner and Rossolimo, 1968; Kapitonov and Kydyrbaev, 1972; Sokolov and Orlov, 1980).

Pelage is soft, with hairs of medium length. Legs and tail are covered by stiff hairs. Upper parts of the body are mainly gray with a yellowish or slightly rufous wash, and underparts are light gray to white. Juvenile pelage is darker and consists primarily of soft, slender hairs. Ears are large and fully haired. Body mass of adults is 31-69 g; pregnant females weigh up to 75 g. Males and females do not differ in weight (Kapitonov and Kydyrbaev, 1972; Shubin, 1959).

The skull presents an unusual appearance in profile (Fig. 2). The dorsal part is convex along the rostrum, slightly concave in the interorbital region, and very slightly convex along the braincase. Owing to the depression of the upper surface, the frontals rise very little above the zygomata. The auditory bulla is simple, as in the subgenus *Alticola*, and rather large (not greatly inflated), with segments around the eustachian tube forming a long pointed process (Hinton, 1926). M3 is longer than M1 and has three lingual and buccal salient angles (Gromov and Polyakov, 1977; Fig. 3). The anterior lobe of M3 is confluent with first loph, and the first buccal loph is distinctly smaller than the second. Length of the tail is from 29 to 37% that of length of head and body. The tail is mostly white, thick, and heavy hirsute with a relatively long brush of terminal hairs (Gromov and Polyakov, 1977).

DISTRIBUTION. The flat-headed vole occurs throughout eastern Kazakhstan, the Altai Mountains, the western part of Tuva,

and in the northwestern part of the Mongolian Altai, Mongolia, as well as in northern Xinjiang, China (Fig. 4; Bannikov, 1954; Ellerman and Morrison-Scott, 1951; Gromov and Polyakov, 1977; Heptner and Rossolimo, 1968; Ma et al., 1981; Ognev, 1950; Sokolov and Orlov, 1980). The nominative subspecies is distributed in Central Altai, the Saur and Tarbagatai ranges, and Zaisan. *A. s. depressus*, described from Chuya River basin (southeastern Altai), is also distributed in the northwestern part of the Mongolian Altai. For many regions no reliable data exist. Vertical distribution ranges from 600 m (Kapitonov and Kydyrbaev, 1972) to 3,000 m (Zonov and Okunev, 1980). *A. s. desertorum* occurs in the eastern part of Karaganda Province of Karkaralinsk and in the southern part of Pavlodar Province Bayan-Aul (Ognev, 1944).

FOSSIL RECORD. No fossils of this species are recognized. Nevertheless, some remains described under *Alticola* from Denisova, Kaminnaya, and Razboinich'ya caves in the Altai Mountains may belong to this species (Galkina and Ovodov, 1975; Ivleva, 1990).

FORM AND FUNCTION. Dental formula of *A. strelzovi* is $i\ 1/1, c\ 0/0, p\ 0/0, m\ 3/3$, total 16 (Gromov and Polyakov, 1977). Molars are hypsodont with little cement in the re-entrant angles. Enamel is relatively thin (Hinton, 1926).

Shubin (1959) described two molts in *A. strelzovi*. In spring (May-June) two molt centers originate in the ventral part of the body, then progress anteriorly and dorsally. A second molt starts in August-October in middorsal spots and spreads to other regions. The winter coat is 2-3 mm longer than the spring pelage.

ONTOGENY AND REPRODUCTION. The reproduction, growth, and development of the flat-headed vole from Kazakh Upland have been studied by Shubin (1959). Females carrying embryos have been recorded in April, May, and June. Females caught in March, July, August, and September were not pregnant. In the Altai during July, 16% of females were pregnant (Boyarkin, 1977). Normally two litters are born per year. The mean number of embryos per female during the first pregnancy is 9.1 (range, 5-13) and during the second pregnancy is 6.9 (range, 4-10). The duration of gestation is estimated at 20 days; lactation ranges from 16 to 18 days.

Adult males with enlarged testes have been taken in the months of April, May, and June. Testes remain large until July and



FIG. 1. Adult *Alticola strelzovi* in the Kurai Steppe, south-eastern Altai Mountains, Russia. Photo by Robert S. Hoffmann.

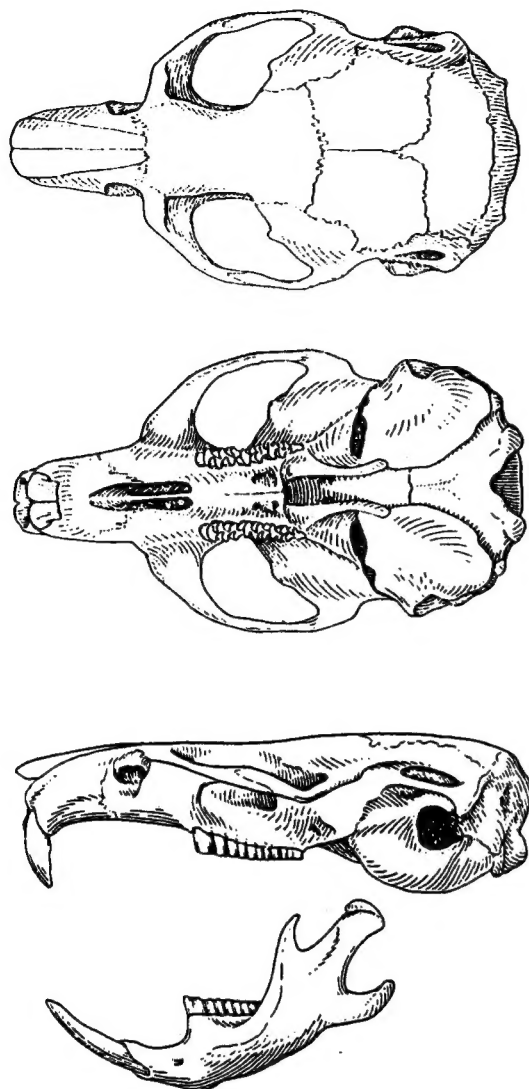


FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Alticola strelzovi* (from Gromov and Polyakov, 1977). Greatest length of cranium is 27.5 mm.

then begin to regress. Adult females increase markedly in weight during the breeding season (Shubin, 1959).

The young weigh 3 g at birth. After 6–7 days the juvenile coat appears. At 9 days of age, the voles have doubled their birth weight. Eyes open after ca. 12 days, when the young spend less time sleeping and become more active. Grass is found in stomachs at this age and the length of the coat is 6 mm long. Young are weaned at ca. 15–16 days of age. At weaning weight averages ca. 15 g, and young could probably survive without maternal care at this time. After 4–5 months the young weigh 35–40 g (Shubin, 1959).

ECOLOGY. The flat-headed vole occupies stony uplands and high mountain steppe zones with rocks. Nests typically are built in niches and rock fissures, under large boulders, or in talus piles (Obolenskiy, 1947). *A. strelzovi* will occasionally dig burrows in soft soil. Typically the nest has several entrances. All voids and fissures around the nest are filled with dung of the vole mixed with leaves, sticks, seeds, small stones, bones, and flower fragments. This conglomerate forms a whole system of walls or an organic debris pile (middens) similar to that produced by *Neotoma* (Cricetidae) in North America. These midden piles are sometimes as long as 8–10 m (Shubin, 1959). The thickness of the midden piles is 10–20 cm (Kapitonov and Kydyrbaev, 1972). Dried middens are cemented by urine, forming a hard organic mass.

The nest chamber is small (1.5–2.0 cm³) and normally located 0.2–1.7 m under the surface of the ground or, in the case of rock shelters, under the midden pile. One nest system is used by several

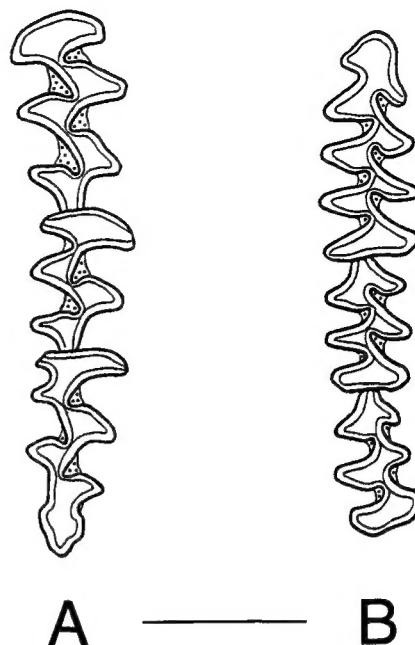


FIG. 3. Occlusal views of upper right (A) and lower right (B) molars of adult *Alticola strelzovi* (from Gromov and Polyakov, 1977). Bar equals 2.0 mm.

generations of animals, although flat-headed voles do not live in colonies. Each nest is occupied by one family consisting of one pair of adults and 5–10 young. In the Altai and Tuva regions, nests of *A. strelzovi* are positioned almost exclusively (75–90%) on southern slopes of mountains. Nest chambers are well insulated and consist mainly (72–87%) of hairs and feathers (Eshelkin and Lazareva, 1975).

In spring when temperatures increase, animals start to feed on roots of plants. During May their stomachs contain exclusively roots. Depending on seasonal variations of local climate, their diet in June may consist predominantly of roots or up to 85% of above-ground plant fragments (Boyarkin, 1977; Zonov and Okunev, 1980).

In eastern Kazakhstan and the Altai and Tuva regions (Boyarkin, 1977; Zonov and Okunev, 1980), food piles (mean = 3.9 g) are dried near the entrance to the nest and covered (apparently so as not to be dispersed by wind) by small rocks gathered into larger piles (mean number of stones per pile = 260). One individual is able to transport ca. 2 kg of rubble per day (Shubin, 1959). When the vegetable debris is dry, flat-headed voles transport it into deep fissures or under large stones. Each family reserves 3–8 kg of hay for winter. During winter when snow cover was thin (3–4 cm) in the Tuva region, voles left their nests to visit fissures filled with food reserves (Zonov and Okunev, 1980). The total number of plant species eaten by the flat-headed vole in different parts of its dis-

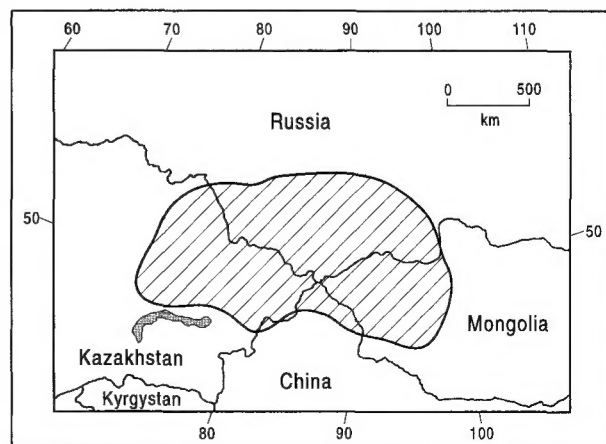


FIG. 4. Distribution of *Alticola strelzovi* in Asia (see text).

tribution is variable, ranging from 74 species in Kazakhstan (Vershinina et al., 1972) and 68 species in Kalbinsk Altai (Kapitonov and Kydyrbaev, 1972) to 10 species in high Altai (Zonov and Okunev, 1980). Food reserves (haystacks) stocked by voles consist mainly of plants found most commonly around the nest. Populations of *A. strelzovi* at different localities of their distribution often forage on specific plant species, typically those most common near the nest (Vershinina et al., 1972).

Fourteen species of fleas (*Amphipsylla prima*, *A. primaris*, *A. rossica*, *Ceratophyllus consimilis*, *C. desertus*, *C. fragilis*, *C. tesquorum transvolgensis*, *Ctenophthalmus brevatus*, *Ctenopsyllus bondari*, *Frontopsylla elata popovi*, *F. elatoides*, *Paradoxopsyllus*, *Pectinocetus lautus*, *Wagnerina tecta*) and four tick species (*Allodesmanysus sanguineus*, *Dermacentor marginalis*, *Haemaphysalis numidiana*, *Rhipicephalus schulzei*) have been identified from *A. strelzovi* (Shubin, 1959). Three species of cestodes were recorded from the liver of the flat-headed vole: *Taenia taebiaeformis*, *Paranopliocephala omphalodes*, and *Aspicularis tetraptera*. One endoparasitic species of Coccidia, *Eimeria arvicolae*, has been identified (Shubin, 1959).

GENETICS. The diploid number of chromosomes is 56 and the fundamental number is 58 (Yatsenko, 1980). Autosomes, which gradually decrease in size, are acrocentric except for one small pair which is metacentric. The X chromosome is a large acrocentric and the Y chromosome is a small-sized submetacentric.

REMARKS. The etymology of the generic name is *altus* (Latin, meaning high) and *colo* or *incola* (Latin, to inhabit or an inhabitant), therefore, *Alticola* refers to an inhabitant of high elevation. The specific epithet, *strelzovi*, is named after Z. E. Strel'tsova. Russian authors often give it the common name Strel'tsov's vole (Gromov and Polyakov, 1977:478). Two different spellings of the scientific name are found in the literature. Kashchenko (1899) originally spelled the species as *strelzovi*, but in his 1901 publication (where his own name is misspelled—Kastschenko) he spelled the specific name *strelzowi*. Thus confusion persists today in how to spell the specific epithet as well as the author's name. Editing suggestions were supplied by I. Y. Pavlinov, B. Krystufek, O. Rossolimo, and P. Ross (Toronto). We thank R. S. Hoffmann for the photograph in Fig. 1. Drafting was provided by the Bilby Research Center, Northern Arizona University.

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